



Miniaturized, Portable Sensors Monitor Metabolic Health

Glenn Research Center

**Orbital Research Inc.
Cleveland, Ohio**

NASA Technology

- ◆ Astronauts who work in space for long durations suffer from cardiovascular deconditioning
- ◆ NASA, Case Western University, and the Cleveland Clinic developed the Portable Unit for Metabolic Analysis (PUMA), which can measure metabolic rates as efficiently as the bulkier metabolic carts



Technology Transfer

- ◆ Orbital Research entered into a Space Act Agreement and worked with NASA to shrink PUMA's components even further in order for the US Navy to study problems with pilots and oxygen deficiency
- ◆ The company then entered into a contract with the US Air Force to develop carbon dioxide sensors, which helped the agency investigate issues with the life support systems onboard F-22 fighter aircraft

Benefits

- ◆ The current PUMA technology is even more lightweight and portable, and improved electronics allow for longer battery life
- ◆ Other projects include contracts with the Navy and bringing the technology into hospitals to monitor patient oxygen intake to improve recovery time